POLYGRAPH

Meet the Parents (2000)
Universal Pictures

TABLE OF CONTENTS

POLYGRAPH

A BRIEF HISTORY

Mankind has always been interested in the truth; and so it was only natural for mankind to investigate, develop, and utilize methods of detecting deception. Trials by ordeal were primitive and usually based on superstition, folklore, or faith. Trials by ordeal included:

- Ordeal of the Hot Iron
- Ordeal of the Balance
- Ordeal of the Rice
- Trial by Torture
- Trial by Donkey
- Trial by Combat
- Ordeal by Pipe
- Trial by Boiling Water

Circa 300 B.C, the Greek physician Erasistratus noticed a connection between one's pulse and the presence of deception. Erasistratus surmised the pulse of a deceptive person quickened when that person was trying to deceive or hide information. In the 1500's, Galileo invented a mechanism that used a pendulum to indicate pulse rate.

Spurred by a scientific approach to the detection of deception in the latter half of the 1800's, the evolution of polygraph progressed rapidly:

- Angelo Mosso conducted experiments on how fear affects the heart and respiration. Eventually Mosso was able to develop a scientific cradle capable of recording changes in respiration and blood pressure induced by fear or emotion swings.
- Marie Vigouroux, Otto Veraguth, Boris Sidis, and Georg Sticker were innovative in their research of a phenomenon known as electrodermal response or electrodermal activity (EDA). EDA involved the body's sweat glands changing resistance electrically to certain external stimuli.
- In 1895 Cesare Lombroso experimented with changes in blood pressure and pulse as a way to detect deception. Lombroso's endeavors led him to invent the Hydrosphygmograph, a device that noted increased blood pressure following relevant questions when put to suspects. Lombroso was the first person to use an instrument to detect deception in a criminal case.
- Vittorio Benussi discovered respiration ratios of inhalation and exhalation before and after a question were different for truth-telling versus lying.
- William Marston developed the technique of reading systolic blood pressure by repeated inflation of a pressure cuff to obtain readings during an examination for deception. Marston's method is responsible for and similar to the procedure used by present day medical personnel. Marston was the examiner in the court case *Frye vs. U.S.*, 1923. The ruling in *Frye vs. U.S.* kept polygraph out of U.S. courts for decades.
- In 1921 John Larson invented a portable polygraph instrument capable of measuring blood pressure and respiration in the course of an examination for deception.
- In 1925 Leonarde Keeler developed the prototype of the modern-day polygraph instrument. By 1938 Keeler was able to add a third channel to the polygraph which measured electrodermal activity (EDA).
- In the 1940's John Reid made two major contributions to polygraph in that he developed a muscle activity recorder and improved questioning techniques.
- In 1958 Richard Arther experimented with having two respiratory channels as EDA manual and automatic modes.
- Cleve Backster developed a Zone Comparison Technique, but more importantly Backster developed a scoring system that made chart analysis more objective and scientific.

There is no test that can detect lies; however, polygraph is a scientific instrument capable of recording four (soon to be five) channels which measure physiological changes that occur when there is a fear of detection of deception. Polygraph is the recognized leader in truth verification.

WHY USE POLYGRAPH?

Polygraph examinations are similar to other scientific and/or forensic tests in that polygraph exams can take the form of either diagnostic tests or screening tests. A diagnostic exam involves the existence of a known problem or facts, known evidence, or known allegations. The purpose of diagnostic tests is to arrive at a conclusion or opinion that will aid in forming a course of action to address the issue(s) at hand. Because that course of action often affects an individual's rights or liberties, using a technique/method that provides less than the highest level of available accuracy would be unacceptable and incomprehensible. At this point in time, the only truth verification method to achieve such accuracy is the polygraph. Diagnostic polygraph exams achieve high accuracy decisions because most of such tests are restricted to a single issue. Examples of polygraph diagnostic exams are, but not limited to:

- Criminal/Investigative Tests
  - Suspects • Witnesses • Victims
- Internal Affairs Tests
  - Accused • Witnesses • Accuser
- Civil Cases
  - Plaintiffs • Defendants

Like medical screening exams, polygraph screening exams are conducted in the absence of a known issue, known incident, or a known problem. Screening tests are intended to aid with risk management decisions that are made in the absence of any known problem or issue. Screening tests should not be used as the sole basis for action that may affect an individual's rights, liberties, or health. Instead, the objectives of polygraph screening exams are the three "D's":

- **Disclosure**
- **Deterrence**
- **Detection**

Examples of polygraph screening exams are, but not limited to:

- Pre-Employment/Hiring Tests
- Security Clearance Tests
- "Maintenance" Tests
  - Sex Offenders

Sectors that utilize polygraph include but not limited to:

- Law enforcement agencies.
  - Federal:
    - ❖ FBI ❖ Secret Service
  - State:
    - ❖ State Highway Patrol ❖ State Police
  - Local:
    - ❖ Police Departments ❖ County Sheriffs
- The legal community.
  - U.S. Attorney Offices • District Attorney Offices • Public Defender Offices
  - Defense Attorney Offices • Parole and Probation Offices • Civil Litigation Offices
- Government agencies.
  - Department of Energy • Department of Defense Agencies • CIA
  - NSA • National Reconnaissance Office • DEA
- The private sector.
  - Corporations (*according to Employee Polygraph Protection Act [EPPA]*) • Citizens (*in matters not involving legal or criminal matters*)

WHY USE POLYGRAPH? (CONTINUED)

So who is using polygraph and why do they use it? The Employee Polygraph Protection Act of 1988 (EPPA) prohibits most private employers from using polygraph testing to screen applicants for employment. EPPA does not affect public employers such as police agencies or other governmental institutions. In the testimony regarding EPPA it became clear that there was no current and reliable data on a variety of important issues about police applicant screening, although polygraph testing had reportedly been used for that purpose since at least the early 1950's. In recognition of this gap, the American Polygraph Association (APA) Research Center at Michigan State University conducted a survey of police executives in the U.S. to determine the extent of, and conditions in which polygraph testing was being used for pre-employment screening. The survey sample included 699 of the largest police agencies in the United States, excluding federal agencies, and produced usable returns from 626 agencies, a response rate of 90%. The major results of the survey showed the following:

- Among the respondents, 62% had an active polygraph screening program, 31% did not and 7% had discontinued polygraph screening, usually because of prohibitive legislation. These findings support the conclusion that a great majority of our largest police agencies do have a polygraph screening program in effect.
- These agencies employ, on average, 447 officers and service a population averaging 522,000 citizens. They primarily use the polygraph to screen applicants for sworn positions; although, 54% also screen persons interested in non-sworn positions. Approximately 25% of the persons tested are disqualified from police employment based on the information developed during polygraph testing which, by the way, is used both to verify information provided in an application form and to develop information that cannot be uncovered by other means.
- Only a very small proportion (2%) of agencies uses polygraph testing as a substitute for a background investigation. A rank ordered listing of topics covered during polygraph testing revealed that investigation of illegal drug usage, employment related dishonesty, and involvement in felonies are the most important.
- When asked to indicate what their reasons were for using polygraph screening, the great majority of the agencies indicated that it reveals information that cannot be obtained by other means. Closely following was the belief that polygraph testing makes it easier to establish background information, it deters undesirable applicants, and it is faster than other methods of selection.
- The three leading benefits of polygraph screening were:
  1. Applications were more honestly completed
  2. Higher quality employees were hired
  3. There were fewer undesirable employees.
- Over 90% of these agencies expressed either moderate or high confidence in their polygraph screening program, and 80% of them reported that, in their experience, the accuracy of the testing ranged between 86%-100%. The only procedure that was considered to be as useful as polygraph screening was a background investigation; all others, including written psychological tests, psychological or psychiatric interviews, personal interviews, and interviews by a selection board were judged to be less useful.
- Finally, this survey also showed that polygraph screening revealed applicant's involvement in serious, undetected criminality. For example, 9% of the agencies said that polygraph screening detected involvement by some applicants in unsolved homicides; 34% indicated some applicant involvement in forcible rape; and 38% showed some applicant participation in armed robberies. Other serious, unsolved crimes, such as burglary, arson and drug offenses were also revealed through polygraph screening.

In addition to the APA study, the U.S. Customs and Border Protection agency conducted its own research. As part of the ongoing discussion regarding the need to screen 100% of the applicants for law enforcement positions, the Assistant Commissioner of Internal Affairs asked the Behavioral Research Branch (BRB) of the Integrity Programs Division (IPD) to qualify the extent of reported negative conduct of those CBP law enforcement officers (LEOs) who took the pre-employment polygraph examination. Practically speaking, it is expected that individuals who pass a pre-employment polygraph examination will be less likely to of record with Internal Affairs for negative conduct in the future. In order to provide context to the question posed, the BRB designed and conducted a comparative study of negative conduct between LEOs who took the polygraph and those who hadn't.

WHY USE POLYGRAPH? (CONTINUED)

A total of 1,293 applicants for the Border Patrol Agent (BPA) and Customs and Border Protection Officer (CBPO) positions took and passed pre-employment polygraph exams with No Significant Responses (NSR) between FY 2008 and FY 2010. Two hundred and three of these applicants (15%) went on to enter on duty as BPAs (194) or CBPOs (9) and attend the Training Academy (referred to as Test). A random sample of 203 CBP LEOs who did not take the pre-employment polygraph, stratified by occupation, was drawn from the Training Academy rosters for the same time period (referred to as No-Test). The LEOs in the Test and No-Test groups were compared on the presence of negative conduct any time between their EOD date and FY 2010. Negative conduct was operationally defined using four measures:

1. Misconduct* reported to the Joint Intake Center (JIC) and recorded in the IPD Misconduct Database
2. Status as a Subject of an allegation or investigation in JICMS
3. Formal Discipline recorded in Personnel Actions in the USDA database
4. Informal Discipline recorded in Labor and Employee Relations (LER)

*Misconduct is defined as an incident in which a CBP employee is arrested, indicted, cited, or detained for a violation of law.

The findings were as follows:

- Twenty LEOs in the Test group and 41 in the No-Test group were determined to be of record with Internal Affairs for at least one instance of negative conduct.
- The negative conduct in question involved drug and alcohol misconduct; misplaced, stolen, and/or damaged government-issued property; terminations based on misconduct; and traffic violations and accidents.
- A chi-square statistic was calculated to determine if there was a significant relationship between whether the applicant took the polygraph exam and subsequent negative conduct. The size of the chi-square statistic revealed a statistically significant relationship between the two variables. *In other words, the difference in the proportion of negative conduct in each group cannot be explained by chance.*

Further analysis revealed that those who did not take the pre-employment polygraph were more than twice as likely to be of record for negative misconduct than those who did take the pre-employment polygraph.

HOW DOES THE COLUMBUS DIVISION OF POLICE USE POLYGRAPH? (OVERALL)

The Columbus Division of Police (CPD) utilizes polygraph for its intended uses:

- Criminal/Investigative Tests
  - CPD Investigative Subdivision
  - Outside Agencies
  - Prosecutor/Stipulated Tests
- Internal Affairs Tests
- Pre-Employment/Hiring Process
  - Initial Background Exam:
    - CPD Police Applicants
    - CFD Fire Applicants
    - CPD Civilian Applicants
  - Specific Issue Exams:
    - CPD Police Applicants
    - CFD Fire Applicants
    - CPD Civilian Applicants
  - Supplemental Exam:
    - CPD Police Applicants
    - CFD Fire Applicants

HOW DOES THE COLUMBUS DIVISION OF POLICE USE POLYGRAPH?

(PRE-EMPLOYMENT/BACKGROUND INVESTIGATIONS)

As one can see, polygraph is an integral part of the Columbus Division of Police, especially the division's hiring process. However, it is noteworthy polygraph is only one part of the hiring process. Assuming an applicant progresses in the process without being removed, the following are the steps of the Background Investigation/Hiring Process:

1. Background Investigations Unit (BIU) receives the eligibility list from the Civil Service Commission.
2. Applicant is emailed a Personal History Statement (PHS) and pertinent documents.
3. As PHS's are returned, applicant undergoes a BIU staff review.
4. The applicant is scheduled and participates in a preinterview, photos and fingerprinting.
5. A polygraph exam is administered to the applicant.
6. Civil Service reviews the applicant's application/file to this point.
7. BIU conducts the applicant's background investigation.
8. BIU meets the applicant for an interview.
9. The applicant engages in a formal interview with a Personnel Evaluation Panel (Oral Board).
10. With the Oral Board's recommendations attached, the applicant's file reviewed by a CPD Chain of Command.
11. The applicant's file is turned over to the Director of Public Safety; he reviews the file and renders a decision.
12. The applicant must pass OPOTC Physical Fitness Testing.
13. A conditional offer is extended to the applicant. At this point, a supplemental polygraph may be warranted.
14. The applicant must pass additional testing:
    - Medical
    - Stress
    - Psychological
15. A final offer of employment is extended to the applicant.

Polygraph examinations are conducted with no preconceived bias or prejudice. In a CPD pre-employment polygraph examination, the questions include, *but are not limited to*, job related inquiries, theft, falsification of information, the use of illegal drugs, illegal sexual activities, and criminal activities. *There are no surprise or trick questions.*

No examiner delves into the following areas:

- Religious beliefs or affiliations (unless specifically relevant to the job)
- Beliefs or opinions regarding racial matters (except to the extent that any such biases could interfere with one's ability to fairly and objectively perform his or her job)
- Political beliefs or affiliations
- Beliefs, affiliations or lawful activities regarding unions or labor organizations
- Lawful sexual preferences

An applicant is not selected based solely on the results of a polygraph. To remove an applicant from the CPD selection process based only on deceptive responses – "a failed" polygraph - would be unethical, incomprehensible, and a violation of the law. As previously noted, screening tests should not be used as the sole basis for action that may affect an individual's rights, liberties, or health. However, a "failed" polygraph can be used to *corroborate other* evidence that an applicant is unfit for the position of police officer.

A polygraph showing deception or significant reactions can possibly be resolved by:

- A specific issue polygraph
- Additional background investigation
- A plausible explanation to the Oral Board as to why the reactions occurred

Indeed, there have been instances where an applicant who has "failed a polygraph" has been given consideration and put in a position to receive a conditional offer by the Safety Director.

POLYGRAPH ACCURACY

So how accurate are polygraphs? One of the problems in discussing accuracy figures and the differences among the statistics quoted by proponents and opponents of polygraph techniques is the way the figures are calculated. At the risk of oversimplification, critics, who often don't understand polygraph testing, classify inconclusive test results as errors. In a real life setting an inconclusive result simply means the examiner is unable to render a definite diagnosis of truth or deception. In such cases a second examination is usually conducted at a later date.

To illustrate how the inclusion of inconclusive test results can distort accuracy figures, consider the following example: If 10 polygraph examinations are administered and the examiner is correct in 7 decisions, wrong in 1, and makes no decision as to truth or deception in 2 (inconclusive), we calculate the accuracy rate as 87.5% (8 definite results, 7 of which were correct). Critics of the polygraph technique often calculate the accuracy rate in this example as 70% (10 examinations with 7 correct decisions). Since those who use polygraph testing do not consider inconclusive test results as meaningful and do not hold them against the examinee, considering them as errors is clearly misleading and certainly skews the figures.

Screening test accuracy: To date, there have been only a limited number of research projects on the accuracy of polygraph in screening contexts, primarily because of the difficulty in establishing ground truth in real world situations. However, since the same physiological measures are recorded and the same basic physiological principles may apply in both event-specific and screening examinations, there is little reason to believe that such testing is of no value in screening situations as some opponents claim. With that said, however, the number of issues, the lack of a known incident along with other factors likely result in lower average accuracies than seen in event-specific testing circumstances.

While no polygraph technique is infallible, research clearly indicates that when administered by a competent examiner who follows proper protocols, polygraph testing is one of the most accurate means available to determine truth and deception.

In an Office of Technology Assessment's (OTA) report on the scientific validity of polygraph testing, the results are such when compared to other fields that utilize diagnostic and screening exams:

Aggregate Measures (Diagnostic Exams)	Sensitivity	Specificity	**Combined Accuracy**	Number of Studies
OTA Findings (w/Inconclusives)	.86	.76	**.81**	10
Current Polygraph Findings	**.92**	**.83**	**.88**	**37**
Medicine	.83	.88	**.86**	94
Psychology	.72	.67	**.70**	51

Aggregate Measures (Screening Exams)	Sensitivity	Specificity	**Combined Accuracy**	Number of Studies
Medicine (Field)	.79	.94	**.86**	10
Current Polygraph Findings (Analog)	**.76**	**.82**	**.79**	**3**
Psychology (Field)	.74	.78	**.76**	36
Current Polygraph Findings (Field)	**.59**	**.90**	**.74**	**2**

There has been much debate over the past 30 years about polygraph and its accuracy, reliability, utility, and lack of theoretical foundation. It should be recognized from this literature review, however, *that many of these same issues could be raised about medical and psychological diagnostic tools.*

POLYGRAPH ACCURACY (CONTINUED)

PH.D. Philip Crewson of the Research Support Service in Ashburn, Virginia, conducted a study in which Dr. Crewson examined the findings of the Office of Technology Assessment's (OTA). Dr. Crewson's study was an effort to put the reported accuracy and reliability of polygraph in context with studies from the medical and psychological literature. The results of Dr. Crewson's study:

Accuracy of screening techniques in polygraph, medicine, and psychology:

- Polygraph = .74
- Medicine = .86
- Psychology = .76

Polygraph accuracy in screening tests lags that of medicine but is comparable to the accuracy in psychological screening tests.

Accuracy of diagnostic techniques in polygraph, medicine, and psychology:

- Polygraph = .88
- Medicine = .86
- Psychology = .70

Polygraph accuracy in diagnostic tests is on a par – even somewhat better than – with that of medicine; but its accuracy clearly outshines that of psychology diagnostic tests.

Overall accuracy on common medical and psychological diseases:

Target Condition	Technique	Accuracy
Acute Appendicitis	CT	**0.96**
Brain Tumor	MRI	**0.95**
Carotid Artery Disease	US	**0.91**
Acute Appendicitis	US	**0.91**
Breast Cancer	US	**0.90**
Deception	**Polygraph**	**0.88**
Breast Cancer	MRI	**0.86**
Breast Cancer	Plain Film	**0.80**
Personality Disorders	DSM-IV**	**0.72**
Depression	MMPI	**0.67**

**Also included studies using ICD-10 and a Personality Index

One can surmise from this data that polygraph is as reliable and valid as other fields that use diagnostic and screening techniques.

Probably the most exhausting and comprehensible study of polygraph accuracy was conducted by the American Polygraph Association (APA). The findings of this study can be found in the APA's **Meta-Analytic Survey of Criterion Accuracy of Validated Polygraph Techniques.** The Meta-Analysis accuracy rates for different polygraph techniques are as follows*:

- Utah ZCT CPC-RCMP Series A/Utah = .939
- Utah ZCT PLT/Utah = .931
- Utah ZCT Combined /Utah = .930
- Event-Specific ZCT = .921
- Federal You-Phase = .904
- Utah ZCT DLT / Utah = .902
- Federal You-Phase/7 position = .883
- Federal ZCT/ 7 position evidentiary = .880
- AFMGQT = .875
- Backster You-Phase = .862
- Federal ZCT / 7 position = .860
- DLST (TES) = .858
- DLST (TES)/ 7 position = .844
- CIT = .823
- AFMGQT/7 position = .817

*Unless notated "7 position" or "Utah," the scoring method was the Empirical Scoring System (ESS)

POLYGRAPH ACCURACY (CONTINUED)

From the APA Mata-Analysis table, one can see modern day polygraph testing techniques have relatively high accuracy rates, ranging from 93.9% to as low as 81.7%. While polygraph techniques are highly accurate, it is not infallible, and errors do occur - as is the case with *any* test. Polygraph errors may be caused by the examiner's failure to properly prepare the examinee for the examination, or by a misreading of the physiological data on the polygraph charts. As with any test involving humans, it's possible for an examiner to do everything correctly and still have the test result in an error. Since it is recognized that any error is damaging, examiners utilize a variety of procedures to identify the presence of factors which may cause errors or an unbiased review of the polygraph records. These procedures include, but not limited to:

- An assessment of the examinee's emotional state
- Technical questions to evaluation the examinee's response capabilities
- Factual analysis of the case information
- A pre-test interview and detailed review of the questions
- Quality control reviews

Because polygraph tests - like all tests - are inherently probabilistic (i.e., they are neither deterministic observation nor physical measurement), they are not perfect. No probabilistic test is completely immune to potential error or threats to test accuracy.

Research has shown that polygraph test accuracy was reduced significantly with the level of functional maturity for young juveniles. In other studies, Abrams and Weinstein (1974) showed the polygraph cannot be expected to be accurate with subjects who have chronic mental health diagnoses within the psychotic spectrum of disorders, and further showed that polygraph accuracy is unstable for people whose intellectual abilities are below the lower limit of the normal range (Abrams, 1974).

Although developmental problems, low intellectual functioning, low functional maturity, and psychosis can adversely affect polygraph accuracy; there is no evidence that psychopathic personality issues will adversely affect polygraph test accuracy. Barland and Raskin (1975) studied criminal suspects with high psychopathic deviate scores on MMPI testing and showed no significant differences in the ability to detect deception. Patrick and Iacono (1989) also showed no significant differences in the detection of deception among psychopathic and non-psychopathic inmates. Raskin and Hare (1978) reported the same conclusion with a different sample of inmate subjects. Balloun and Holmes (1979) showed that polygraph accuracy using a guilty knowledge test paradigm was also not significantly different for college students with high and low psychopathic deviant scores on MMPI testing. Although both the Office of Technology Assessment (1983) and the National Research Council (2003) expressed concern at the notion that polygraph test accuracy may be lower for persons with dangerous personality profiles, *both reported that the published scientific evidence does not support, and consistently refutes, the hypothesis that psychopaths believe their lies and can therefore defeat the polygraph.* In summary, polygraph testing with psychopathic persons can be assumed to be similar - as accurate and as inaccurate - as that with non-psychopathic persons. Regardless, public and media reactions may tend to simplistically assume that a person has "beaten" the polygraph whenever a testing error is observed. Some proportion of testing errors should not be surprising unless the proportion of errors can be shown as exceeding the 95% confidence interval for normally expected error rates.

POLYGRAPH ADMISSIBILITY

There is the perception that polygraph exams cannot be admitted or used in a court of law. That perception is incorrect. Previously noted was the fact *Frye vs. U.S.* was a court case in which the ruling kept polygraph out of U.S. courts for decades. However, the 1993 U.S. Supreme Court case, *Daubert v. Merrell Dow Pharmaceuticals*, Inc., 509 U.S. 579 (1993), a ruling was issued in which the Court articulated a new set of criteria for the admissibility of scientific expert testimony. The *Daubert* ruling supersedes *Frye* and basically states that expert testimony may be admitted as evidence if the testimony is able to pass a three-pronged test:

1. Reliability of its Scientific Principles
   - Whether the theory or technique employed by the expert is generally accepted in the scientific community;
   - Whether it has been subjected to peer review and publication;
   - Whether it can be and has been tested;
   - Whether the known or potential rate of error is acceptable; and
   - Whether the research was conducted independent of the particular litigation or dependent on an intention to provide the proposed testimony
2. Qualifications of the Expert Witness
   - The expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
   - The testimony is based on sufficient facts or data;
   - The testimony is the product of reliable principles and methods;
   - The expert has reliably applied the principles and methods to the facts of the case.
3. Usefulness of the Testimony

What we can take away from *Daubert* is that the burden of scientific judgement has shifted onto judges. A trial judge now has wide discretion to admit or exclude the testimony, including that of a polygraph examiner and/or polygraph test.

In the 1989 case *U.S. vs. Piccinonna*, the court found that, in the wake of new empirical evidence and scholarly opinion, the wholesale exclusion under Fed. R. Evid. 702 was unwarranted, and that polygraph evidence might be admitted at trial when:

- Both parties stipulated in advance as to the test's circumstances and as to the scope of its admissibility.
- The court found that polygraph evidence also might be used to impeach or corroborate the testimony of a witness at trial, subject to three preliminary conditions: the party planning to use the evidence must provide adequate notice to the opposing party; the opposing party must be given reasonable opportunity to have its own polygraph expert administer a test covering substantially the same questions, and admissibility was to be governed by the Federal Rules of Evidence.

In *U.S. vs. Piccinonna*, the court vacated appellant's conviction for knowingly making false statements to a grand jury and remanded for further proceedings because it found that polygraph expert testimony and polygraph examination evidence may be admissible when both parties stipulated in advance as to the test's circumstances and the scope of its admissibility and also to impeach or corroborate testimony.

POLYGRAPH ADMISSIBILITY (CONTINUED)

Ohio is a "stipulated" state, meaning that a stipulated polygraph exam can – and most likely will be – admitted as evidence. In the State of Ohio v. Souel, 372 N.E.2d 1318 (1978), it was the ruling of court that the results of a polygraph examination are admissible in evidence in a criminal trial for purposes of corroboration or impeachment, provided that the following conditions are observed:

(1) The prosecuting attorney, defendant and his counsel must sign a written stipulation providing for defendant's submission to the test and for the subsequent admission at trial of the graphs and the examiner's opinion thereon on behalf of either defendant or the state.

(2) Notwithstanding the stipulation, the admissibility of the test results is subject to the discretion of the trial judge, and if the trial judge is not convinced that the examiner is qualified or that the test was conducted under proper conditions he may refuse to accept such evidence.

(3) If the graphs and examiner's opinion are offered in evidence the opposing party shall have the right to cross-examine the examiner respecting:

(a) the examiner's qualifications and training;

(b) the conditions under which the test was administered;

(c) the limitations of and possibilities for error in the technique of polygraph interrogation; and,

(d) at the discretion of the trial judge, any other matter deemed pertinent to the inquiry.

(4) If such evidence is admitted the trial judge should instruct the jury to the effect that the examiner's testimony does not tend to prove or disprove any element of the crime with which a defendant is charged, and that it is for the jurors to determine what weight and effect such testimony should be given.

ASTM International is an international organization that develops and publishes standards for a myriad of materials, products, systems and services. In the United States, ASTM standards have been adopted, by incorporation or by reference, in many federal, state, and municipal government regulations. According to ASTM International's website, the organization has published standards regarding polygraph examinations. That fact is noteworthy because there is no documentation in which a court challenge to any ASTM standard has been upheld. In other words, courts have always sided in favor of the ASTM standard.

(Note – At present, it appears Computer Voice Stress Analysis (CVSA) does not have the same status as polygraph in that no ASTM standard applies to CVSA. In fact, one of the entries on the ASTM website reads "Within the past decade a number of so-called voice stress analyzers have been marketed for law enforcement and forensic science purposes. These devices are said to extract from the vocal spectrum a sub-audible microtremor signal that is useful in detecting stress in a speaker's voice; thus, it is claimed these devices have great utility as lie detectors and are as accurate as the traditional polygraph instrument. A review of the evidence now accumulated about these devices shows that the evidence for the existence of a microtremor in the voice is problematic and that the capability of these devices in detecting stress is equally questionable. Without exception, however, the scientific evidence reported to date shows that voice stress analyzers are not effective in detecting deception; none of these devices has yet been shown to yield detection rates above chance levels in controlled situations.")

ACKNOWLEDGEMENTS

Sources used or cited in this work (not all inclusive):

- The American Polygraph Association
- National Polygraph Academy
  - Pam Shaw, Director - Ms. Shaw is currently the President of Shaw Polygraph Services, Inc. and owner of Credibility Solutions and Technologies PTE LTD in Singapore. Pam holds a bachelor's degree in Exercise Science and a Master's degree in Allied Health Education from Eastern Kentucky University. She spent 15 years with the Kentucky Law Enforcement Council where she served as the Testing Services Section Supervisor. As a result, she regularly conducted polygraph examinations in service to over 400 law enforcement agencies in state of Kentucky. Additionally she oversaw the quality control program for the unit and held the position of Director of the Kentucky Institute of Polygraph Studies. Pam is a licensed polygraph examiner, a Past-President and Chairman of the Board of the APA and served on the board in various other positions for 7 years. She has additionally served as President and Vice-President for the Kentucky Polygraph Association. She is a member of the American Association of Police Polygraphists and a regular guest speaker at various international and state association seminars. She also serves as an adjunct professor at the Texas Department of Public Safety Polygraph School and as the Principal Primary Instructor for the Singapore Ministry of Defense Centre for Credibility Assessment.
  - Mike Gougler, Director - Mr. Gougler is currently the President of The Gougler Company LLC. He is a veteran of 38 years in the law enforcement profession. Mike graduated from Sam Houston State University with a B.S. degree in Law Enforcement and Police Science and is a graduate of the Northwestern University School of Police Staff and Command. On September 12, 2013, he honorably retired as the Deputy Director of the Texas Racing Commission and on May 31, 2008, he honorably retired from the Texas Department of Public Safety. He held the position of Assistant Commander of the Criminal Intelligence Service at that time. Mike is a licensed polygraph examiner, a Past-President and Chairman of the Board of the APA and continues to serve on the Board as Seminar Chair. He has served the State of Texas on the Polygraph Examiners Board under three governors, Ann Richards, George W. Bush and Rick Perry. He is a member of the American Polygraph Association, the American Association of Police Polygraphists and the Texas Association of Law Enforcement Polygraph Investigators. He also was the founder and previous director of the Texas DPS Law Enforcement Polygraph School.
- *Polygraph*, 2015, From the American Polygraph Association
  - Raymond Nelson is a polygraph examiner and psychotherapist who has authored numerous papers and studies on many aspects of the polygraph test. Mr. Nelson is a researcher associated with the Lafayette Instrument Company, is the curriculum director of an accredited polygraph training program, and is an elected member of the Board of Directors of the American Polygraph Association - currently serving in the role of President. Mr. Nelson has taught at several polygraph training programs, is an active speaker and presenter at both international conferences, and has been an expert witness in several court jurisdictions regarding both polygraph and psychotherapy matters.
- PEAK Credibility Assessment Training Center
  - Benjamin Blalock, Director - Mr. Blalock is a United States Army veteran and a former interrogation and counter-intelligence soldier, Special Agent, government employee and contractor in the intelligence field. He has extensive experience and specialized training in polygraph, interviewing, interrogation, and vulnerability assessment. Mr. Blalock holds both Bachelor of Arts and Master of Arts degrees, and has extensive investigative training. He has conducted and quality controlled countless polygraph examinations, interviews, interrogations and investigations for federal government, private and law enforcement agencies throughout the world, including the Middle East. He is a Post-Conviction Sex Offender Testing (PCSOT) Instructor, and has administered countless PCSOT polygraph examinations. Mr. Blalock has authored and co-authored several polygraph-related articles, and has traveled throughout the world as a much sought-after presenter on various polygraph topics. Not only is he a graduate of the world-renowned National Center for Credibility Assessment (NCCA), and a past Director of the International Academy of Polygraph, and the Academy of Polygraph Science (APS), but he is also the current Director of the PEAK Credibility Assessment Training Center based in Cape Coral, Florida.
- Wikipedia
- Meta-Analysis, From the American Polygraph Association
- *A Comparative Analysis of Polygraph with other Screening and Diagnostic Tools*, Philip E. Crewson, Ph.D.
- U.S. Customs and Border Protection
- ASTM International
- https://www.casemine.com/judgement/us/5914c590add7b049347d5214
- http://www.lawschoolcasebriefs.net/2013/12/united-states-v-piccinonna-case-brief.html
- https://www.nap.edu